

A-E Guide Vol 2 (A) MANUAL

Cost  
Estimating

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Note: Cost Estimating forms are available thru your assigned Project  
Manger.

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## FOREWORD

This Guide is an alternate to the Computer Aided Cost Estimating System (CACES) method of preparing Military Cost Estimates. In the event of conflict between this Guide and the contract document, the contract document shall take precedence, and the A-E shall document the conflict in writing and bring it to the immediate attention of the Corps of Engineers' Project Manager (PM).

CAUTION TO ALL USERS: THE USE OF THIS GUIDE REQUIRES APPROVAL FROM THE CHIEF OF COST ESTIMATING, U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT.

PURPOSE.....#  
A-E GUIDE - VOLUME 2  
Cost Estimating (Manual Format)

PURPOSE:

To present guidance for the preparation of military construction cost estimates.

TYPES OF ESTIMATES.....#  
TYPES OF ESTIMATES:

Design Estimates

- Code A     Budget Estimates
- Code B     Concept & Preliminary Estimates
- Code C     Final Estimates

Value Engineering Forms

- VEAF       Value Engineering Alert Form
- ACM        Abbreviated Cost Model
- GFA        Graphical Functional Analysis

METHOD OF PREPARATION.....#  
METHOD OF PREPARATION

The Architect-Engineer (A-E) shall prepare cost estimates using:

- Manual Format

SUBMITTAL REQUIREMENTS.....#  
SUBMITTAL REQUIREMENTS

The A-E will submit the cost estimate concurrently with each design submittal, but under a separate cover. The A-E's scope of work defines the specific submittals required. The A-E shall provide a back check cost estimate for resolution of, and compliance with, estimating comments when requested.

SECTION

SECTION I

I      MANUAL CODE A.....#

MANUAL CODE A

## CODE A PREPARED ESTIMATE

The Code A estimate is a general (order-of-magnitude) estimate based on limited project information. The estimate consists of unit costs applied to the major items and quantities of work. The estimate shall separate the project's Building Cost from the Site and Utilities cost. A separate System Summary Sheet is required for each Building. If the Site and Utilities are non-continuous, one System Summary Sheet for each totally separate area is required.

The unit cost shall reflect the complete direct current cost of work - complete cost being labor, material, waste allowance, subcontractor's markups, sales tax, etc. After unit costs have been totaled the contractor's markup and escalation shall be applied. On the summary sheet, Building Cost and Site and Utilities are totaled to obtain a Total Base Contract Cost. To complete the estimate, Contingencies During Construction, Supervision & Administration, and Sub-Allotment costs are added.

## MANUAL FORMAT FOR CODE A

The A-E shall prepare a Code A estimate when required by the scope of work. The Code A estimate shall be organized as outlined using the cost estimating sheets shown in this section of the guide.

NOTE: The A-E may elect to prepare the estimate using an electronic spreadsheet, however, the original estimating sheets must be duplicated. The deliverable items are as follows:

- A. ESTIMATE COVER SIGN-OFF SHEET
- B. SUMMARY SHEET
- C. ESTIMATE

The estimate consists of System Summaries and Unit Cost Estimate Sheets.

- D. BACKUP DATA
  - 1. Building Floor Layout (To scale)
  - 2. Site Plan (To scale)

#### OUTLINE SCENARIO: WORK TASKS

- A. Prepare Building Layout & Site Plan
- B. Prepare Unit Cost Estimate
- C. Prepare System Summary Sheets
- D. Prepare Summary Sheet
- E. Prepare Estimate Cover Sign-Off Sheet
- F. Submit Deliverable Items as Required
- G. Correct Estimate per Review Comments
- H. Submit Back Check Estimate

#### ORGANIZATION OF CODE A ESTIMATE

Code A estimates shall be organized as follows:

- A. An estimate Cover Sign-Off Sheet shall be submitted followed by a Summary Sheet. Subtotals from each System Summary Sheet are forwarded to the Summary Sheet.
- B. A System Summary Sheet, Building Cost shall be provided for each building.
- C. A System Summary Sheet, Site and Utilities shall be provided.
- D. Unit Cost Estimate sheets shall be provided to support the System Summary Sheets.
- E. A Building Floor layout plan shall be provided for each building.
- F. A Site & Utility plan shall be provided showing proposed outside works.

ESTIMATING SHEETS

CODE A ESTIMATES

## ESTIMATE COVER SIGN-OFF SHEET

The purpose of this sheet is to:

A. Provide Cover

Provide a common cover sheet for all Military Cost Estimate submittals to U.S. Army Corps of Engineers, Sacramento District.

B. Identify Project

Identify project by Project Title, Project Location (Installation Name and State), Specification Number, and Project Number.

C. Sign-Off

Identifies the Architect-Engineer Firm, provides for sign-off by the responsible A-E representative, and provides their respective phone numbers.



## SUMMARY SHEET

The purpose of this sheet is to:

### A. Summarize Costs

The Building Cost(s), Site & Utilities Cost, Sub-Allotment Cost, and Additive Cost(s) are summarized to this sheet from all cost distribution sheets. Separate buildings shall be listed and the cost of each building shall be shown on the Summary Sheet. The Total Building Cost shall also be shown.

### B. Develop Current Working Estimate

The CWE is developed by including Contingencies During Construction, and Supervision & Administration costs. The Contingencies During Construction shall be 5% for new work or 10% for alteration work. Supervision & Administration shall be 5.5% except Operation and Maintenance (O & M) projects which are normally 7.5%; check with Corps of Engineers' Project Manager.

### C. Show Funding Information

The Programmed Amount (PA), 90% Programmed Amount, and Midpoint of Construction are stated. The A-E may obtain PA information from the Corps of Engineer's Project Manager.

All costs shall be rounded to the nearest hundred dollars.

SPEC NO:  
DATE:  
EST BY:  
CODE:

	. . . . .	\$
	. . . . .	
	. . . . .	
Total Buildings	. . . . .	\$
SITE & UTILITIES	. . . . .	
Total Contract Cost	. . . . .	\$
Contingencies During Construction . .( %)	. . . . .	
Subtotal	. . . . .	\$
Supervision & Administration . . .( %)	. . . . .	
Total Construction	. . . . .	\$
SUB-ALLOTMENT	. . . . .	
Total CWE Without Additives . . . . .		\$
ADDITIVE ITEMS		
A1	. . . . .	
A2	. . . . .	
A3	. . . . .	
Total Additive Contract Cost . . . . .		\$
Contingencies During Construction . .( %)	. . . . .	
Subtotal	. . . . .	\$
Supervision & Administration. . . .( %)	. . . . .	
Total Additives CWE . . . . .		\$
Total CWE Including All Additives . . . . .		\$

Programmed Amount . . . . . \$  
90% Programmed Amount . . . . . \$

Based on Midpoint of Construction During \_\_\_\_ Month, Calendar Year, 19 \_\_\_\_.  
SYSTEM SUMMARY SHEET, BUILDING COST  
SPK FORM 54

The purpose of this sheet is to:

A. Categorize Costs

Building costs shall be categorized to the System Summary format.

B. Estimate Quantities and Unit Costs

Unit square foot measurement most applicable to the System should be selected in place of lump sum pricing whenever possible. For example, the total exterior wall square footage and an overall current applicable unit cost should be estimated.

C. Summarize Costs

Direct costs shall be summarized.

D. Apply Markups and Escalation

Markups shall be applied to the current direct cost; escalations shall then be applied to establish the Midpoint Building cost.

Rounding:

- a. Estimated Quantity to three significant figures.
- b. Unit Cost to three significant figures or nearest 5 cents.
- c. Total Cost to nearest dollar.
- d. "Building Cost (rounded)" to nearest hundred dollars.

SYSTEM SUMMARY SHEET, SITE AND UTILITIES  
SPK FORM 55

The purpose of this sheet is to:

A. Categorize Costs

Site and Utilities Cost shall be categorized to major Account Descriptions.

B. Estimate Quantities and Unit Cost

Unit measurements should be selected and the associated unit cost be in place of lump sum pricing whenever possible. Current and complete unit costs shall be shown.

C. Summarize Costs

Direct costs shall be summarized.

D. Apply Markups and Escalation

Markups shall be applied to the current direct cost; escalations shall then be applied to establish the Midpoint Site and Utilities cost.

Rounding:

- a. Estimated Quantity to three significant figures.
- b. Unit Cost to three significant figures or nearest 5 cents.
- c. Total Cost to nearest dollar.
- d. "Site and Utilities (rounded)" to the nearest hundred dollars.

UNIT COST ESTIMATE  
SPK FORM 56 (TEST)

The purpose of this sheet is to:

A. List Work

List work items in sufficient detail to ensure a complete and adequate estimate.

B. Provide Estimated Quantities

Listed work items shall be assigned known or assumed quantities with stated units. Waste allowances and contingencies shall not be included. but applied within the unit prices or shown separately.

C. Estimated Unit Cost

Unit costs shall be used in place of lump sum pricing whenever possible. Unit costs shall reflect current direct prime contractor's cost. which includes:

1. All working trade labor, wages, fringes, taxes, insurance and pertinent costs.
2. Plant and Equipment chargeable directly against work.
3. Materials and Supplies, waste, losses, storage, discountsor vendor's markups and sales tax.
4. Subcontractor's cost shall be "cost to prime", therefore including subcontractor's markup, or maybe subcontractor's direct cost with markups shown separately.

D. Summarize Work

Direct costs shall be subtotaled sufficiently to permit prior analysis and allow the reviewer to track figures to preceding summary sheets.

Rounding:

- a. Estimated Quantities to three significant figures.
- b. Unit Cost as appropriate to the item and estimate.
- c. Total Cost to the nearest dollar.

SECTION II

II    MANUAL CODE B & C.....#

MANUAL CODE B & C

#### MANUALLY PREPARED ESTIMATE

Manually prepared Code B and C estimates shall be based on a detailed quantity take-off (no lump sum) and be priced using labor (man-hours) and material direct costs. Costs shall consist of the current prime contractor's or subcontractor's direct costs. The assumed breakdown between prime work and subcontract work shall reflect current construction practices. The assumed breakdown shall be clearly shown throughout the estimate with markups shown separately.

The labor man-hours shall be subtotaled for similar features of work and multiplied by a composite crew rate. Payroll burden shall then be applied. The composite crew rate shall be based on the project's local current prevailing wages. The prevailing wages shall never be lower than the current Davis-Bacon wage decision.

Material dollars shall reflect current cost and shall include delivery, discounts, waste allowance, and other necessary priced components. Material prices shall be "cost to the contractor or subcontractor," except sales tax which shall be separately shown. Contractor's plant and equipment cost necessary for construction shall be shown in the material column and annotated except for site work that requires uses of form 53a.

#### CODE B ESTIMATE

The Code B estimate is an early design, concept or preliminary, type estimate. A detailed breakdown of the work shall be listed and described whenever possible. Quantities shall be based to the maximum extent possible on detailed take-off; remaining quantities shall be based on assumptions intended to assure an adequate overall estimate. For the Code B estimate only. Design Contingencies shall be added on the Trade Summary sheet to reflect the incompleteness of design. Use 5 percent for new facility construction and 10 percent for remodel of existing facilities.

Partial backup data shall be furnished; it shall consist of overhead breakdown, quantity take-off, labor rates, and quote information. The quote information will be obtained from local suppliers, subcontractors or other sources that may reasonably be expected to engage in the construction of the project. Reference books, estimating manuals, Unit Price Book (CACES), and other general reference guides are not acceptable sources for a quote.

#### CODE C ESTIMATE

The Code C estimate is a final estimate. A detailed breakdown of the work shall be listed that reflects the drawings and specifications. Quantities shall be based on detailed take-off. Design contingencies shall not be added on the Trade Summary sheet.

Complete backup data shall be furnished; it shall consist of overhead breakdown, detailed quantity take-off, labor rate and quote information.

## MANUAL FORMAT FOR CODE B & C

The A-E shall prepare a Manual Code B and/or Code C estimate when required by the scope of work. The Code B and Code C estimate shall be organized as outlined using the cost estimating sheets shown in this section of the guide.

NOTE: The A-E may elect to prepare the estimate using an electronic spreadsheet, however, the original estimating sheets must be duplicated.

The deliverable items are as follows:

- A. ESTIMATE COVER SIGN-OFF SHEETS
- B. SUMMARY SHEET
- C. DETAILED ESTIMATE

The detailed estimate consists of Cost Distribution Sheets, Trade Summary Sheets and Construction Cost Estimate Sheets.

### D. BACKUP DATA

- 1. Distributive Cost Breakdown.
- 2. Take-Off Worksheets.
- 3. Supporting Quotes and Information.
- 4. Value Engineering Forms (when applicable).
- 5. If the A-E elected to use an electronic spreadsheet, an IBM-compatible floppy disk with print & worksheet files for all computerized portions of the estimate.



OUTLINE SCENARIO: WORK TASKS

- A. Perform Quantity Survey.
- B. Obtain Supporting Quotes and information.
- C. Prepare Construction Cost Estimate Sheets.
- D. Prepare Trade Summary Sheets.
- E. Prepare Overhead and Distributive Cost Breakdown.
- F. Prepare Cost Distribution Sheets.
- G. Prepare Summary Sheet.
- H. Prepare Estimate Cover Sign-Off Sheet.
- I. Submit Deliverables as required.
- J. Correct Estimate per Review Comments.
- K. Submit Back Check Estimate.

## ORGANIZATION OF CODE B AND C ESTIMATES

Manual Code B and C estimates shall be organized as follows:

A. Only one Summary Sheet is used for an estimate. Subtotals from each Cost Distribution Sheet, along with Sub-Allotment cost, are forwarded to the Summary Sheet.

B. Individual buildings shall be separated. A Cost Distribution Sheet, a Trade Summary Sheet and Construction Cost Estimating sheets shall be provided for each building.

C. Site and Utility costs shall be separated from the building costs. If more than one Site and Utility areas exist (totally separated construction sites), Site and Utility costs for each area will be separated. Each Site and Utility shall have a Cost Distribution Sheet, a Trade Summary Sheet, and Construction Cost Estimating sheet(s).

D. Additives and options shall be separated. Each additive or option shall have a Cost Distribution Sheet, a Trade Summary Sheet, and Construction Cost Estimating sheet(s).

E. Sub-Allotment costs shall be separated. Sub-allotments are costs the government shall incur, but are not part of the project contract. An example is the cost a telephone company may charge to bring phone lines to a project.

F. Backup data for the estimate shall be separated. Backup includes material such as quotes, labor rate calculations, and material take-off sheets.

ESTIMATING SHEETS

MANUAL METHOD FOR  
CODE B & C ESTIMATES

## ESTIMATE COVER SIGN-OFF SHEET

The purpose of this sheet is to:

A. Provide Cover

Provide a common cover sheet for all Military Cost Estimate submittals to U.S. Army Corps of Engineers, Sacramento District.

B. Identify Project

Project is identified by Project Title. Project Location (installation Name and State), Specification Number, and Project Number.

C. Sign-Off

Identifies the Architect-Engineer Firm, provides for sign-off by the responsible A-E representative, and provides their respective phone numbers.

## SUMMARY SHEET

The purpose of this sheet is to:

### A. Summarize Costs

The Building Cost(s), Site & Utilities Cost, Sub-Allotment Cost, and Additive Cost(s) are summarized to this sheet from all cost distribution sheets. Separate buildings shall be listed and the cost of each building shall be shown on the Summary Sheet. The Total Building Cost shall also be shown.

### B. Develop Current Working Estimate

The CWE is developed by including Contingencies During Construction, and Supervision & Administration costs. The Contingencies during Construction shall be 5% for new work or 10% for alteration work. Supervision and Administration shall be 5.5% except Operation and Maintenance (O & M) projects which are normally 7.5%; check with Corps of Engineers' Project Manager.

### C. Show Funding Information

The Programmed Amount (PA), 90% Programmed Amount, and Midpoint of Construction are stated. The A-E may obtain PA information from the Corps of Engineers' Project Manager.

All costs shall be rounded to the nearest hundred dollars.

SPEC NO:  
DATE:  
EST BY:  
CODE:

	. . . . .	\$
	. . . . .	
	. . . . .	
Total Buildings	. . . . .	\$
SITE & UTILITIES	. . . . .	
Total Contract Cost	. . . . .	\$
Contingencies During Construction . .( %)	. . . . .	
Subtotal	. . . . .	\$
Supervision & Administration . . .( %)	. . . . .	
Total Construction	. . . . .	\$
SUB-ALLOTMENT	. . . . .	
Total CWE Without Additives . . . . .		\$
ADDITIVE ITEMS		
A1	. . . . .	
A2	. . . . .	
A3	. . . . .	
Total Additive Contract Cost . . . . .		\$
Contingencies During Construction . .( %)	. . . . .	
Subtotal	. . . . .	\$
Supervision & Administration. . . .( %)	. . . . .	
Total Additives CWE . . . . .		\$
Total CWE Including All Additives . . . . .		\$

Programmed Amount . . . . . \$  
90% Programmed Amount . . . . . \$

Based on Midpoint of Construction During \_\_\_\_ Month, Calendar Year, 19 \_\_\_\_.

COST DISTRIBUTION SHEET  
SPK FORM 50

The purpose of this sheet is to:

A. Apply Prime Markups

Markups (General Requirements, Home Office Overhead, Profit & Bond) shall be considered as money to the prime contractor. The Prime Contractor's markups are applied to work performed by the Prime's forces, employees, and equipment, and work that is subcontracted out. Subcontractor's markups are included on the Construction Cost Estimate sheets.

B. Escalate Costs

Costs are escalated from the estimate's base, which is normally the preparation date, to the midpoint of construction.

C. Apply Site Adjustment Factor

Site Adjustment Factor is normally not applicable since detailed costs on the Construction Cost Estimate sheets must be based upon the project's local material and labor conditions.

All costs shall be rounded to the nearest dollar, except "Subtotal (Rounded)" shall be to the nearest hundred dollars.



TRADE SUMMARY SHEET, BUILDING  
SPK FORM 51

The purpose of this sheet is to:

A. Categorize Costs

Building costs shall be categorized to the major Construction Specifications Institute (CSI) Division. Use Divisions 02 thru 16. The 01 Division shall not be included; General Requirements (Field Overhead) and Home Office Overhead costs shall be placed on The Cost Distribution Sheet.

B. Separate Prime vs. Sub Work

The estimator shall divide costs into either "Prime" work or "Sub" work, reflecting current construction contracting and subcontracting procedures.

C. Summarize Costs

Prime, Sub, and total direct costs shall be summarized.

D. Include Design Contingencies

This is not applicable for Code C, final estimate. For code B estimates, the estimator shall determine the amount based on an allowance for miscellaneous items commensurate with the state of design and the completeness of the quantity survey.

All costs shall be rounded to the nearest dollar.

TRADE SUMMARY SHEET, SITE AND UTILITIES  
SPK FORM 52

The purpose of this sheet is to:

A. Categorize Costs

Site & Utilities Cost shall be categorized to major Supporting Facilities.

B. Separate Prime vs. Sub Work

The estimator shall divide costs into either "Prime" work or "Sub" work, reflecting current construction contracting and subcontracting procedures.

C. Summarize Costs

Prime, Sub, and total direct costs shall be summarized.

D. Include Design Contingencies

Not applicable for Code C, final estimate. For Code B estimates, the estimator shall determine the amount based on an allowance for miscellaneous items commensurate with the state of design and the completeness of the quantity survey.

All costs shall be rounded to the nearest dollar.

## CONSTRUCTION COST ESTIMATE SHEETS

BUILDING COST  
SPK FORM 53 (TEST)

The purpose of these sheets is to:

A. List Work

The minimum level of detail shown in the estimate shall be equal to the detail shown on the drawings. Items shown on the drawings shall be individually listed and priced within the estimate.

B. Provide Estimated Quantities

Quantities shall be stated with units, and carried to three significant figures. Waste allowance shall not be included, but applied to material prices.

C. Detail Labor Man-Hours

Unit Man-Hours shall be shown to three significant figures, except that they shall not exceed three decimal places. Total Man-Hours shall be rounded to the nearest tenth of an hour for each descriptive work item listed.

D. Price Material

Material Prices shall be "cost to the contractor", including waste allowance, discounts, freight, storage, etc.

E. Summarize Work

Labor man-hours shall be summarized as required to apply appropriate labor rates.

Material prices shall be summarized, and then sales tax added.

Subtotal for Prime and Subcontractor work shall be indicated. Subcontracted work shall indicate Subcontractor's markups.

## CONSTRUCTION COST ESTIMATE SHEETS

### SITE AND UTILITIES COSTS SPK FORM 53a (TEST)

NOTE: See Appendix D for the required form if the major part of the project includes any one of the following:

Heavy Earthmoving, Runways & Taxiways, Well Drillings, Etc.

The purpose of these sheets is to:

A. List Work

The minimum level of detail shown in the estimate shall be equal to the detail shown on the drawings. Items shown on the drawings shall be individually listed and priced within the estimate.

b. Provide Estimated Quantities

Quantities shall be stated with units, and carried to three significant figures. Waste allowance shall not be included, but applied to material prices.

C. Detail Labor Man-Hours

Unit Man-Hours shall be shown to three significant figures, except that they shall not exceed three decimal places. Total Man-Hours shall be rounded to the nearest tenth of an hour for each descriptive work item listed.

D. Price Equipment

Equipment prices shall include Ownership and operating expense rates.

E. Price Material

Material Prices shall be "cost to the contractor," including waste allowance, discounts, freight, storage, etc.

F. Summarize Work

Labor man-hours shall be summarized as required to apply appropriate labor rates.

Equipment prices shall be summarized.

Material prices shall be summarized, and then sales tax added.

Subtotal for Prime and Subcontractor work shall be indicated. Subcontracted work shall indicate Subcontractor's markups.

### GENERAL REQUIREMENTS AND OVERHEAD SPK FORM 57

The purpose of this sheet is to:

A. Determine General Requirements

Estimate the type and extent of general requirement expenses for the particular project. Field expenses shall be divided into three major categories: distributives, personnel, and facilities.

B. Determine Home Office Expenses

Although each contractor operates differently, the estimated expenses shown should reflect a competitive bidding contractor's operation that is likely to bid the particular project.

CONSTRUCTION COST ESTIMATE WORKSHEET  
SPK FORM 58 (TEST)

The purpose of this sheet is to:

A. Provide Backup Data

All Code B or C estimates require some backup data. These sheets can be used to show take-off and other backup information. Major money items shall be supported by take-off worksheets. Information should serve to inform the reviewer, and support the items, quantities, and prices found on the Construction Cost Estimate sheets. Reviewer may require that further back-up be provided when necessary.

QUOTATION RECORD  
SPK FORM 59

The purpose of this sheet is to:

A. Record Quotation Information

Backup quotation records shall be submitted on:

1. Major Mechanical and Electrical Equipment

Transformers, Switch Gear, Refrigeration Equipment, Air Handling Devices, Boilers, Pumps, etc.

2. Special System and Items

Energy Monitoring Control Systems (EMCS), Fire Suppression System, Cranes, Elevators, Special Doors, Tempest Rooms, Computer Floors, etc.

3. Major Materials Used in Construction

Ready-Mix Concrete, Sand, Aggregate, Gravel, Asphaltic Concrete, Masonry Block, Roofing Materials, Large Pipe, etc.

4. Special Construction

Pre-engineered Buildings, Material Handling Systems, Storage Tanks, etc.

B. Record Quotation Background

Quotations may be obtained by written or telephone method. Background information shall include, at least, company's name, phone number with area code, and person contacted.

The quote information shall be obtained from local suppliers, subcontractors or other sources that may reasonably be expected to engage in the construction of the project. Reference books, estimating manuals, Unit Price Book (CACES), and other general reference guides are not acceptable sources for a quote.

	SECTION III	
III	VALUE ENGINEERING.....	#

VALUE ENGINEERING (VE)



## VALUE ENGINEERING (VE)

Value Engineering (VE) is a systematic approach in order to obtain optimum value for every dollar spent. The VE approach is a creative effort directed toward the analysis of function. This creative effort is based on development of alternative solutions for specific function. This is in contrast to simply cutting cost by using cheaper material or reducing quantities. Value Engineering analyze function by asking questions such as:

What is it?

What does it do?

What must it do?

What does it cost?

What other materials or method would do?

What would these other materials or methods cost?

Value Engineering analysis for a specific project begins by categorizing and displaying costs. Various forms are used to categorize and display costs depending upon the Current Working Estimate (CWE) of the project. The Value Engineering approach used the following forms:

- A. Value Engineering Alert Form (VEAF)
- B. Abbreviated Cost Model (ACM)
- C. Graphical Function Analysis (GFA)

## VALUE ENGINEERING FORMAT

The A-E, when required by the scope of work, shall categorize and display the project cost. The deliverable items shall be included as backup data with the estimate. The items are as follows:

A. All projects with CWE between \$500,000 and \$2,000,000 shall be categorized and displayed on the Value Engineering Alert Form (VEAF).

B. All projects with CWE in excess of \$2,000,000 shall be categorized and displayed on the Abbreviated Cost Model (ACM) and shall include Graphical Functional Analysis (GFA) for the three highest cost Functions.

## OUTLINE SCENARIO: WORK TASKS

- A. Prepare Detailed Estimate  
(per other applicable Section in this Guide)
- B. Determine if the VEAF or the ACM and GFA are to be prepared.
- C. Prepare the appropriate VE forms.
- D. Submit Deliverable items as required.
- E. Correct VE Forms per Review Comments.
- F. Submit Back Check VE Forms.

## VALUE ENGINEERING (VE) FORMS

VALUE ENGINEERING ALERT FORM (VEAF)

The purpose of this sheet is to:

A. Identify Entire Facility

List total CWE cost, quantity and unit. Develop a cost/unit relationship using the most reflective quantity and unit for the entire facility.

B. Identify High Cost Items

High cost items in the estimate shall be listed in descending order of cost.

C. Indicate Cost for Items

The cost associated with each item shall be the total CWE cost of that item. All markups in the estimate shall be included when developing the item's associated cost.

D. List Quantities and Units

The quantity and units most reflective of the items function shall be used.

E. Calculate Unit Cost

Divide the items cost by the items quantity.

F. Display High Cost Items on Bar Chart

Draw a bar chart for each of the above High Cost Items using the associated CWE cost of each item.

Rounding:

- a. Costs shall be to the nearest dollar.
- b. Quantities to three significant figures.
- c. Unit Cost to three significant figures.

## ABBREVIATED COST MODEL (ACM)

The purpose of this sheet is to:

### A. Identify Entire Facility

List total CWE cost, quantity and unit. Develop a cost/unit relationship using the most reflective quantity and unit for the entire facility.

### B. Classify All Cost Into Six Major Functions

The cost associated to each function shall be the total CWE cost for that item. All markups in the estimate shall be added when developing the function's associated cost.

### C. Develop Unit Cost for Functions

Divide the functions cost by the quantity (using quantity and unit used for the entire facility). State each unit cost for each function.

Rounding:

- a. Cost shall be to nearest hundred dollars.
- b. Unit Cost to three significant figures.

## GRAPHICAL FUNCTION ANALYSIS (GFA)

The purpose of this sheet is to:

### A. List Subfunctions

For each of the three highest cost functions a separate Graphic Function Analysis will be provided. List the Subfunction for the particular function.

### B. Bar Chart Each Subfunction

Chart each Subfunction to a common scale (Common for that Functional category). The length of the bar is based on the cost of the Subfunction relative to the Scale.

SAMPLE VE FORM

VALUE ENGINEERING ALERT FORM (VEAF)

SAMPLE VE FORM

ABBREVIATED COST MODEL (ACM)

GRAPHIC FUNCTIONAL ANALYSIS (GFA)



A TRI-SERVICE MILITARY CONSTRUCTION  
PROGRAM (MCP) INDEX.....#

APPENDIX A

TRI-SERVICE MILITARY CONSTRUCTION PROGRAM (MCP) INDEX

# TRI-SERVICE MILITARY CONSTRUCTION PROGRAM (MCP) INDEX

This sheet provides the index numbers for use in escalating to midpoint of construction. The MCP Index is adjusted reflecting revised and projected economic conditions. The A-E shall check with the Corps of Engineers' project manager to obtain the latest MCP Index. The example below shows how the index numbers corresponding to the Midpoint of Construction date and the Estimate Base date are used to compute escalation. (See bottom of Cost Distribution Sheet SPK Form 50.)

## EXAMPLE

	DATE	INDEX NUMBER
MIDPOINT OF CONSTRUCTION	OCT 86	1492
ESTIMATE BASE	JAN 85	1410
ESCALATION FACTOR =	$\frac{\text{MIDPOINT INDEX}}{\text{BASE INDEX}} = \frac{1492}{1410}$	$= 1.058$
PERCENT ESCALATION =	$(\text{ESCALATION FACTOR} - 1) \times 100 = 5.8 \%$	

B      MANUAL CODE A SAMPLE ESTIMATE.....#

## APPENDIX B

MANUAL CODE A SAMPLE ESTIMATE

C     MANUAL CODE B AND C SAMPLE ESTIMATE SHEETS....#

## APPENDIX C

MANUAL CODE B AND C SAMPLE ESTIMATE SHEETS

APPENDIX D

SITE AND UTILITIES COSTS  
HEAVY CONSTRUCTION

REASONABLE CONTRACT ESTIMATE WORKSHEET SUMMARY  
ENG FORM 1740

The purpose of these sheets is to:

A. List Work

List subitem from ENG FORM 1741c with unique and full descriptions.

B. Separate Plant, Labor, Material and Supplies

These items shall be summarized.

C. Summarize Work

Subtotals for Prime and Subcontract work shall be indicated.  
Subcontracted work shall indicate Subcontractor's markups.

REASONABLE CONTRACT ESTIMATE WORKSHEET  
ENG FORM 1741

The purpose of these sheets is to:

A. List Work

The minimum level of detail shown in the estimate shall be equal to the detail shown on the drawings. Items shown on the drawings shall be individually listed and priced within the estimate. List detail plan of operation showing the methodology used for calculating production from which the job time is determined.

REASONABLE CONTRACT ESTIMATE WORKSHEET  
ENG FORM 1741c

The purpose of these sheets is to:

A. List Equipment Costs

List unit of equipment, size, number, hours, rate, and amount for each used. Equipment rate shall be based on ownership and operating expenses. Subtotal equipment costs. Add mobilization and demobilization of equipment. Add small tools as a percent of labor cost. Add the total equipment cost.

B. List Labor Costs

List labor operation, craft, number, hours, rate, and amount for each used. Labor rate shall include base rate, overtime, taxes & insurance, fringe benefits, and travel or subsistence which shall be calculated on DA Form 5420-R. Add the total labor cost.

C. List Material Costs

List material, unit, quantity, price and amount. Quantities shall be stated with units and carried to three significant figures. Waste allowance shall not be included. Material prices shall be "cost to the contractor", including waste allowance, discounts, freight, storage, etc.

D. List Supply Costs

List supplies, unit, quantity, price and amount. Quantities shall be stated with units, and carried to three significant figures. Waste allowance shall not be included. Supply prices shall be "cost to the contractor", including waste allowance, discounts, freight, storage, etc.



WAGE RATE CALCULATIONS  
DA FORM 5420-R

The purpose of this sheet is to:

A. List Craft Labor Cost Data

List craft description, basic hourly wage rate, overtime, taxes & insurance, fringe benefits, travel or subsistence, and total hourly cost.

QUOTATION RECORD  
SPK FORM 59

The purpose of this sheet is to:

A. Record Quotation Information

Backup quotation records shall be submitted on:

1. Major Mechanical and Electrical Equipment

Transformers, Switch Gear, Pumps, etc.

2. Major Materials and Supplies Used in Construction

Ready-Mix Concrete, Sand, Aggregate, Gravel, Asphaltic Concrete, Large Pipe, etc.

B. Record Quotation Background

Quotations may be obtained by written or telephone method. Background information shall include, at least, company's name, phone number with area code, and person contacted.

The quote information shall be obtained from local suppliers, subcontractors or other sources that may reasonably be expected to engage in the construction of the project. Reference books, estimating manuals, Unit Price Book (CACES), and other general reference guides are not acceptable sources for a quote.